AMENDMENTS

In the Claims:

1. (Currently Amended) An tunable optical device, comprising:

a holographic element, having a single hologram therein which has a predetermined relationship to a plurality of wavelengths;

a wavelength varying element, coupled to said holographic element, and varying said predetermined relationship; and

a first optical system, handling first wavelengths of an optical signal which pass through said holographic element without being changed by said single hologram as an output signal; and a second optical system, separate from said first optical system, and handling a second optical signal including said plurality of wavelengths having said predetermined relationship as varied by said wavelength varying element.

2. (Currently Amended) A device as in claim 1, wherein said wavelength varying element includes an element which physically moves said single hologram.

4. (Original) A device as in claim 1, wherein said second optical system handles wavelengths to be dropped.

5. (Currently Amended) A device as in claim 4, wherein said holographic element includes a single hologram form therein which includes a plurality of different Bragg matching conditions depending on an angle of incidence with respect to an orientation of the single hologram, and said wavelength varying element includes an element which

physically moves said single hologram to apply said optical signal through a different orientation of said single hologram which has different Bragg matching characteristics.

6. (Currently Amended) A device as in claim 5 wherein said physically moving comprises rotating said single hologram.

7. (Original) A device as in claim 6 wherein said rotating comprises rotating said single hologram to form a section of a cone.

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9. (Original) A device as in claim 1 wherein said output signal extends in substantially a same direction as an input signal.

10. (Original) A device as in claim 1 wherein said output signal travels in substantially an opposite but parallel direction to an input signal.

11. (Original) A device as in claim 4 wherein said second optical signal is a drop output signal which travels in a different direction than either an input signal or said output signal.

13. (Original) A device as in claim 9, further comprising a double prism forming a retroreflecting operation to reflect the output signal in said opposite direction.

14. (Original) A device as in claim 1, further comprising an optical detector, receiving said drop signal, and converting said drop signal to an electrical signal indicative thereof.

15. (Original) A device as in claim 14, further comprising a laser element, receiving said electrical signal and converting said electrical signal to an optical signal.

16. (Original) An apparatus as in claim 15 wherein said laser is a DFB laser.

17. (Currently Amended) A device as in claim 1, wherein said single hologram comprises a light diffracting structure.

18. (Original) A device as in claim 4 further comprising an add port, allowing additional wavelengths to be added to the output signal.

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19 (Previously Amended). An device as in claim 18, wherein said add port comprises a Y junction.

20. (Currently Amended) A device as in claim 1, wherein said holographic element includes a single hologram form therein which includes a plurality of different Bragg matching conditions depending on an angle of incidence with respect to an orientation of the single hologram, and said wavelength varying element includes an element which physically moves a direction of an input light beam relative to said single hologram to apply said optical signal through a different orientation of said single hologram which has different Bragg matching characteristics.

21. (Original) A device as in claim 1, wherein said second optical system handles wavelengths to be added.

22. (Currently Amended) A device as in claim 1, wherein said holographic element includes said single hologram forming a grating as part of said holographic

element, said grating interacting with a wavelength based on a characteristic of a material forming said holographic element.

25. (Original) A device as in claim 18, wherein said second optical signal travels in substantially a same direction as said first optical signal.

26. (Original) A device as in claim 18, wherein said second optical signal travels in a direction which is substantially 180 degrees opposite from said first direction.

27. (Original) A device as in claim 1, wherein said first optical signal travels in a different direction than said second optical signal.

30. (Original) A device as in claim 1, wherein said first optical system includes a lens.

31. (Original) A device as in claim 30, wherein said lens is a GRIN lens.

38 (Currently Amended). A method for multiplexing wavelengths, comprising:

applying an input optical signal having a plurality of wavelengths therein to an area of a single hologram;

tuning said single hologram to one of said plurality of wavelengths; and

adjusting said single hologram to separately optically process said one of said wavelengths differently from others of said wavelengths.

39 (Previously Amended). A method as in claim 38, wherein an output signal includes all wavelengths except said one of said wavelengths and producing a dropped signal including only said one of said wavelengths.

40. (Original) A method as in claim 39, further comprising changing a direction of said dropped signal using said hologram.

41. (Currently Amended) A method as in claim 38, wherein said adjusting comprises physically moving said single hologram.

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43. (Original) A method as in claim 38, further comprising using said hologram to merge said one of said wavelengths as added signal with others of said wavelengths as an output signal.

49 (Currently Amended). A method as in claim 38, wherein ~~said~~ an optical output signal travels in substantially a same direction as said input optical signal.

50. (Original) A method as in claim 38, wherein a first optical output signal including said one of said wavelengths travels in substantially an opposite direction from an input optical signal.

51. (Original) A method as in claim 38, wherein a first optical output signal including said others of said wavelengths and a second optical output signal including said one of said wavelengths travel in different directions.

52. (Original) A method as in claim 51, wherein said first and second output signals have a constant angle there between.

53 (Previously Amended). A method as in claim 38 wherein said adjusting comprises changing a direction of said one of said plurality of wavelengths to a different direction than another of said plurality of wavelengths.

54. (Currently Amended) A method as in claim 38, wherein said tuning comprises moving said single hologram.

55. (Original) A method as in claim 38, wherein said tuning comprises moving said incident light to a different angle.

59. (Original) A method as in claim 38, further comprising adding an additional optical wavelength to said output signal.

60. (Currently Amended) An apparatus, comprising:

an optical filter element comprising a hologram material with a single hologram form thereon;

an optical system, positioned to apply an optical signal to said single hologram;

a tuning element, changing a way that said optical signal is applied to said single hologram to change a Bragg matching condition between said optical signal and said single hologram and thereby Bragg match to a different resonant wavelength in said optical signal;

a first output path for light that is not Bragg matched to said single hologram extending in a first direction, and

a second output path for light that is Bragg matched to said single hologram of extending along a second optical path, wherein said second optical path is in a different direction than said first optical path.

61 (Currently Amended). An apparatus as in claim 60, wherein said tuning element changes by moving said single hologram.

63 (Currently Amended). An apparatus as in claim 61, wherein said moving said single hologram moves said hologram in a way which forms a substantially cone shape.

64. An apparatus as in claim 60, further comprising an add port, which allows adding additional wavelengths to the output signal.

72. (Currently Amended) An tunable optical device, comprising:

a holographic element, having a single holographic element therein which has a predetermined Bragg matching relationship to a plurality of wavelengths depending on an orientation parameter;

a wavelength varying element, changing said orientation parameter;

an optical system, receiving first wavelengths of an optical signal which has passed through said holographic element without being changed by said single hologram as an output signal in a first direction, and receiving a second optical signal including said wavelength having said predetermined relationship in a second direction.

73. (Currently Amended) A device as in claim 72, wherein said optical system further includes an element which applies light to said single hologram to merge said one of said wavelengths as added signal with others of said wavelengths as an output signal.

74. (Currently Amended) A device as in claim 72, wherein said single hologram includes:

a diffraction structure therein.

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75. (Currently Amended) A device as in claim 72, wherein said single hologram includes a grating therein.

76. (Currently Amended) A device, comprising:

a holographic material, including a single holographic grating formed therein;

an optical system, providing an input optical beam to said holographic material, and obtaining an output optical beam from said holographic material, said input and output optical beams being different; and

a tuning system, which tunes the way in which said input and output beam are different by varying an effective period length of ~~a~~ said single holographic grating.

77. (Original) A device as in claim 76, wherein said tuning system comprises an element which mechanically rotates said holographic material.

83 (Previously Amended). A device as in claim 76, wherein said output optical beam includes a first output optical beam and a dropped optical beam, extending in

different directions, said first output optical beam having at least one frequency band removed relative to said input optical beam.

84. (Original) A device as in claim 76, wherein said input optical beam includes a first input optical beam, and a second input optical beam with at least one wavelength range to be added to contents of said first input optical beam, said first and second input optical beams coming from different directions.

85. (Original) A device as in claim 76 wherein said input optical beam and said output optical beam have parts which extend in substantially the same directions.

87. (Currently Amended) A device, comprising:

a holographic storage element, formed with a single hologram therein in the shape of a grating; and

an optical tuning element, tuning an operation of said holographic storage element to react to different optical frequencies.

88. (Currently Amended) A device as in claim 87, further comprising an optical system, coupling an input optical beam to said single hologram.

89. (Original) A device as in claim 87, wherein said optical tuning element operates to change an optical angle of incidence of an input optical signal.

90. (Original) A device as in claim 87, wherein said optical tuning element operates to change a mechanical orientation of said holographic storage element.

93. (Currently Amended) A device as in claim 88, wherein said optical system includes an input optical fiber, an output optical fiber, and a dropped output optical fiber, wherein said single hologram operates to diffract said different optical frequencies selected by said optical tuning element, to said dropped output optical fiber.

94. (Original) A device as in claim 88, further comprising a repeater element, receiving an output optical signal, converting said output optical signal to an electrical signal, and reconverting said electrical signal to an optical signal.

95. (Original) A device as in claim 93, wherein said optical system includes a double prism, which reflects an output optical signal back in the direction of its incidence, said double prism located in a direction where it will not contact a dropped optical signal for said dropped output optical fiber.

96. (Original) A device as in claim 87, wherein said optical tuning element changes an effective period length of the holographic grating.